

A Measure of Maternal Competence

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A MEASURE of maternal competence in child rearing has been constructed for use as a research tool in exploring the relationship between maternal competence and pediatric care. Because one goal of pediatric care is to increase the mother's knowledge of information important for competent child care, a measure of this acquired knowledge becomes an indirect measure of the quality of the pediatric care provided.

In this report, we are primarily concerned with the construction of an initial measure of knowledge of infant care to be applied before pediatric care is provided and the relationship of this measure to some other maternal characteristics. The

construction procedure consisted of defining the knowledge to be measured, generating a pool of questions to measure that knowledge, and performing an item analysis to select questions to be used in testing a sample of pregnant women. The relationships of the questions selected to age, experience in child care, education, parity, and anticipated source of pediatric care were explored within the samples evaluated.

Method

The domain of knowledge to be measured was defined as the facts a mother should know in order to be competent in providing care to her well (or

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healthy) baby. The information initially comprising this domain was incorporated by one of us (RAH) within 113 factual statements under the following 13 categories: well care, feeding, elimination, cleanliness, environment, development, behavior, crying, regurgitation, immunization, accident prevention, illness, and medication.

To broaden the base of professional opinion that these statements were important, they were mailed to 308 pediatricians who practiced in up-state New York and were members of the American Academy of Pediatrics. They were asked to score each of the statements as being "very important," "somewhat important," or "not important" for mothers to know in order to provide adequate care for their well infants.

Responses were received from 171 (56 percent) of the pediatricians. More than 50 percent of these respondents rated 110 statements as at least "somewhat important" for mothers to know or be in agreement with. For example, statements rated as relatively unimportant included, "Whether or not it is better to have a brown or yellow bowel movement than to have a green one," and "When during normal development a baby will have his first tooth." Statements rated as relatively important included, "Not to give left over medicine for apparently similar illness without physician's permission" and "A baby should get most of his primary immunizations by the time he is a year old."

The 110 statements retained as important defined the domain of knowledge to be measured. From these, 130 separate questions were generated for potential inclusion in a maternal competence questionnaire. Most of the questions required short answers which could be coded objectively. Because it was known that some women in the target population could not read, the questions were to be presented orally.

The questionnaire was originally designed for use in a study employing four pediatricians and three pediatric nurse practitioners; therefore, it was necessary to define the correct answers in terms of their agreed opinion. Thus, the questions were administered to each of these professionals, and then they were discussed to obtain a consensus. Approximately 30 items were eliminated because these physicians and nurses did not agree on the correct answers. The remaining 100 items were tested on a sample of 15 women to determine if the items were worded clearly and if the

responses were scorable. Six items were eliminated because it was not possible to obtain responses which could be coded as right or wrong by an objective criterion.

The remaining 94 items were incorporated into a preliminary maternal competence questionnaire. This was administered to a sample of 59 women in order to obtain data for an item analysis. The sample was drawn from pregnant women receiving prenatal care in the Obstetrics Clinic of Strong Memorial Hospital or in a private obstetrician's office. An attempt was made to draw an equal number of primipara and multipara patients from each of these settings.

The resulting sample differed on a number of variables, in addition to source of care and parity. The 30 women in the private-practice sample were older, on the average, than the 29 women attending the clinic; also, as expected, the multiparas were generally older than the primiparas. Of the 29 clinic patients, 12 were black, while all the private-practice patients were white. Since the primary goal of testing this sample was to obtain the data necessary for an item analysis, no attempt was made at random or stratified sampling.

The following are examples of the kinds of items which survived the item analysis and the corresponding correct answers:

<i>Question</i>	<i>Answer</i>
At what age do you think most babies can sit alone?	5-8 mos.
If vitamins are not already in infant's diet, which ones should be added?	A, C, & D
A baby needs to be more warmly dressed than an adult.	False
How many shots are needed to prevent measles?	1
If a mother is nervous and tense when she is handling her baby, would it change the way the baby acts?	Yes

Results and Discussion

The data obtained from the responses of the 59 women were used for an item analysis of the 94 potential test items. The potential items were evaluated on the basis of difficulty and homogeneity (1). Items which were too difficult or too easy to provide much differentiation among those tested were eliminated. For example, most of the women did not know when they should stop giving vitamins or when they should be concerned if their babies could not hold their heads up when

Mothers were asked to point out potential dangers for a child in this picture



Responses scored as correct: 1. toys on stairs, 2. stairs accessible, 3. loose rug, 4. open wall plaster, 5. iron cord within reach, 6. medicines

within reach, 7. cleaning compounds within reach, 8. oven door open, 9. stool near stove, 10. scissors within reach, 11. pot handle turned out.

lying prone or could not stand alone. On the other hand, all the women agreed that immunizations were necessary and that they should keep a record of their babies' immunizations. They also agreed on the inadvisability of administering medications without directions from a physician or nurse.

Since there was no outside criterion of maternal competence against which to evaluate the individual items, they were evaluated against the total score on all items. Thirty-four items were eliminated; some because they correlated negatively with the total score, and others because they correlated so low with the total item score as to hold little promise of contributing to the measurement of maternal competence.

Of the remaining 60 items, 40 were selected for inclusion in an initial measure of maternal competence. The mean score obtained by the 59 women on these 40 items, scoring 1 for each correct answer, was 23.5, with a standard deviation of 7.8. The individual scores ranged from 5 to

39, essentially over the total possible range of the test without a floor or ceiling effect. The internal reliability of these 40 items (as measured by the Kuder-Richardson formula 20) in a later sample of 263 primiparas was .76. In addition to the single-response items in the questionnaire, a visual item was constructed to show potential dangers for a child (see picture). The mothers were asked to point out these hazards; their responses scored as correct are shown under the picture. The number of correct answers given for the picture correlated .40 with the 40-item questionnaire.

We evaluated the potential usefulness of the initial maternal competence measure for both mothers who would be using clinic pediatricians and those who would be using private pediatricians, as well as for women who would be having their first child and women who had had children previously. The mean scores for these four subgroups of the sample of 59 women were as follows:

Correlations among variables (below diagonal) and with education partialled out (above diagonal)

Variable	Maternal competence	Education	Setting	Parity	Experience
Maternal competence.....			.28	.44	.45
Education.....	.63				
Setting.....	.60	.72		-.01	.00
Parity.....	.27	-.11	-.09		.69
Experience.....	.19	-.24	-.16	.69	

NOTE: Boldfaced correlations are significant at $P < .05$.

Parity	Private practice		Clinic	
	Number	Score	Number	Score
Primiparas.....	15	26.1	12	15.2
Multiparas.....	15	30.1	17	21.3

The analysis of variance was as follows:

Source	Sum of squares	df	Mean square	F ratio
Parity	372.3	1	372.3	111.1
Setting.....	1,404.8	1	1,404.8	42.0
Interaction.....	16.4	1	16.4	
Residual.....	1,839.1	55	33.4	

¹ $P < .01$.

The difference in knowledge pertinent to infant care between the private practice and the clinic women was substantial and significant statistically ($P < .01$). The higher scores obtained by the multiparas are also significant ($P < .01$) and provide some construct validity to the measure of maternal competence, since the rearing of children should increase knowledge of infant care.

The correlations of the 40-item maternal competence scale with a number of other variables in the selection sample are shown in the table. The highest correlate of maternal competence was education, as measured by the number of years of schooling ($r = .63$). The next highest correlate of maternal competence was the setting ($r = .60$)—clinic versus private practice—which has substantial variance in common with education ($r = .72$); the private-practice patients scored higher on maternal competence and education. The setting, however, is related to maternal competence independent of education ($r = .28$, $P < .05$).

Parity and experience in child care, in terms of number of children in the mother's home and time she spent in child care, are almost two different measures of the same thing ($r = .69$). The relatively low correlations of both parity ($r = .27$) and experience in child care ($r = .19$) with maternal competence are, in part, a result of the negative correlation between education and experience ($r = -.24$). The women with more educa-

tion had less experience in child care. Thus, the partialing out of education increases the correlations of parity to .44 and experience in child care to .45. Multiple correlation techniques show that the two variables of education and parity can predict 50 percent of the variance in maternal competence scores.

This instrument does not measure the aspect of maternal competence that is not related to verbal knowledge and skills. The most important component of competent child care is probably emotional and affective rather than cognitive and intellectual. To the extent that the two are related, the instrument may measure the affective component. However, the aspect of competent child care which cannot be measured by a verbal instrument is also the aspect which is not subject to change through pediatric care. Therefore, the insensitivity of this instrument to nonverbal aspects of maternal competence does not detract from its potential value for measuring the change in maternal competence as a measure of quality of care.

Both the item analysis data and the sensitivity of the completed form in detecting expected relationships with other variables indicate that the maternal competence questionnaire is an instrument with construct and content validity which can be used in pediatric research in measuring knowledge important for maternal competence. However, there is presently no information concerning the predictive validity of this instrument as a measure of either the actual behavior of the mother in caring for her infant or of the physical and emotional health of the child as influenced by maternal behavior. The examination of these relationships awaits further research.

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